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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/597,148

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Atsushi Marugame

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WHITHAM, CURTIS & CHRISTOFFERSON & COOK, P.C.

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SUITE 340

RESTON, VA 20190

EXAMINER

DRENNAN, BARRY T

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/597,148	<b>Applicant(s)</b> MARUGAME, ATSUSHI	
	<b>Examiner</b> Barry Drennan	<b>Art Unit</b> 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/13/06, 9/25/06, 1/29/08, 5/4/09, 7/15/09</u> .              | 6) <input type="checkbox"/> Other: _____                          |



## **DETAILED ACTION**

### ***Response to Preliminary Amendment***

1. The preliminary amendment filed concurrently with the filing of this application has been entered. Accordingly, claims 1-26 are pending in the application.

### ***Priority***

2. This application claims benefit of an earlier filing date as a national stage application under the Patent Cooperation Treaty of PCT/JP2005/000054, filed 6 January 2005. This application also claims foreign priority benefit under 35 U.S.C. 119(a)-(d) of JP 2004-005388, filed in Japan on 13 January 2004.

### ***Information Disclosure Statement***

3. Several of the references cited on the Information Disclosure Statement filed 25 September 2006 have not been considered. The cited documents are foreign patent documents, but no English translation and no statement of relevance has been provided. 37 CFR 1.98(a)(3) requires an English translation of these documents if a translation is at least readily available to any individual associated with the filing or prosecution of the application (see 37 CFR 1.56(c)), or, if no such translation is available, a concise explanation of the relevance of the cited documents.

4. Several of the references cited on the Information Disclosure Statement filed 4 May 2009 have not been considered. These documents are not U.S. patents or patent application publications, but no copies of these documents, or the portion of these documents which caused them to be listed, were furnished by Applicant to the Office. 37 CFR 1.98(a)(2) requires copies of these documents to be submitted to the Office in order for them to be considered.

5. Those documents which did not meet the requirements of 37 CFR 1.98(a), but for which an equivalent U.S. Patent or Patent Application Publication document was found, have been considered in the interest of furthering prosecution; their U.S. equivalent documents have been cited on the attached Notice of References Cited.

### ***Specification***

6. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Automatic aging of face images using closest matching images from a library of exemplars".

### ***Claim Objections***

7. **Claim 21** is objected to because of the following informality: The claim recites a "program... executed by a computer, comprising a storing device". Clearly, the computer, rather than the program, comprises the storing device, but the phrasing of the

claim makes this somewhat unclear. Examiner recommends amending the claim to recite "executed by a computer, the computer comprising a storing device".

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 101***

8. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

9. ***Claims 1-10*** are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. The Federal Circuit<sup>1</sup>, relying upon Supreme Court precedent<sup>2</sup>, has indicated that a statutory "process" under 35 U.S.C. 101 must (1) be tied to a particular machine or apparatus, or (2) transform a particular article to a different state or thing. This is referred to as the "machine or transformation test", whereby the recitation of a particular machine or transformation of an article must impose meaningful limits on the claim's scope to impart patent-eligibility (See *Benson*, 409 U.S. at 71-72), and the involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity (See *Flook*, 437 U.S. at 590"). While the instant claims recite a series of steps or acts to be performed, the claims neither transform an article nor positively tie to a particular machine that

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<sup>1</sup> *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

<sup>2</sup> *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

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accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

That is, a particular machine is neither recited nor required in performing the method steps. Furthermore, there is no eligible transformation, despite the manipulation of data: the unmodified data is not necessarily representative of a physical object or substance (except in claims 6-8 and 10), and there is no claimed depiction of the modified data as an external representation of the physical object or substance in a manner which is not merely insignificant extrasolution activity.

10. **Claims 21-26** are rejected under 35 U.S.C. 101 as being directed toward nonstatutory subject matter. The claims are directed to “a program”, i.e., functional descriptive material *per se*; while the claims also recite “a storage device storing a plurality of data which are relating to a plurality of images...”, this limitation is directed to *nonfunctional* descriptive material. Both functional and nonfunctional descriptive material claimed *per se* are nonstatutory (In re Warmerdam, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994)). Furthermore, the combination of functional and nonfunctional descriptive material claimed *per se* is no more statutory than either one is separately.

### ***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. **Claims 1-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lanitis et al., "Toward automatic simulation of aging effects on face images," IEEE Trans. on Pattern Analysis and Machine Intelligence, Vol. 24 No. 4 (published April 2002, cited by Applicant, hereinafter **Lanitis**), and further in view of Lee et al., "Polymorph: morphing among multiple images," IEEE Computer Graphics and Applications, Vol. 18 No. 1, pp. 58-71 (published February 1998, hereinafter **Lee**).

13. With respect to **claim 1**, Lanitis discloses A feature changed image generating method for generating a new image from an input image, comprising:

providing a database in which a plurality of data, which are relating to a plurality of images respectively, are classified into a plurality of categories (**Sec. 3, data being that of the images themselves, the identity of the individual, and the age of the individual; categorized by, e.g., identity of the pictured individual or by the age of the pictured individual; alternatively, see Sec. 6.4**);

determining an image which is most similar to said input image as a selected image based on a data belonging to a specified category specified from said plurality of categories (**Sec. 6.2, "the most appropriate aging function for a new individual is the aging function of the most similar individual from our database"**).



Lanitis discloses applying to the image the aging function from the most similar individual<sup>3</sup>, but does not explicitly disclose "merging said selected image and said input image".

However, Lee discloses techniques for merging two face images (**see, e.g., Fig. 2**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Lanitis by merging the images as taught by Lee instead of applying the aging function of Lanitis, representing the substitution of one known technique for another with predictable results.

14. With respect to **claim 2**, Lanitis and Lee teach the method of claim 1. Lanitis further discloses that, in said providing, a database in which said plurality of images are classified into said plurality of categories (**Sec. 3**); and

in said determining, an image which is most similar to said input image among images belonging to said specified category is selected as said selected image (**Sec. 6.2**).

15. With respect to **claim 3**, Lanitis and Lee teach the method of claim 1. Lanitis further discloses that a database in which constituent components of said plurality of images are classified into said plurality of categories is provided in said providing

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<sup>3</sup> This could debatably qualify as merging the images, but for the purposes of this rejection, applying the aging function is considered not to be the same as merging the selected and input images.

**(clearly, since the image data is provided, the constituent components are provided as well; Sec. 3).**

Lanitis further discloses determining a combination of constituent components being most similar to the input image, and generating the most similar image **(the image must be retrieved from the database, i.e., generated, Sec. 6.2; the image is a combination of its constituent components, and of all the images, i.e., combinations of constituent parts, evaluated for similarity, the method of Lanitis retrieves the most similar one).**

However, Examiner notes that the present claims seem also to be directed toward generating new images not already in the database, and points to Lanitis, Sec. 6.3, Eq. 9, which indicates that when there is no particularly good match, a combination of images based on their similarities is considered to obtain a weighted aging function. Further, Lee teaches a method of obtaining a combination of images based upon constituent components, e.g., eyes, nose, mouth **(p. 60; see Fig. 2)**. An ordinary artisan could thus replace the weightings of Lanitis with the composite images of Lee, representing the substitution of one known technique for another with predictable results.

16. With respect to **claim 4**, Lanitis and Lee teach the method of claim 1. Lanitis further discloses that a database is provided in which said plurality of images are classified into said plurality of categories, and each of said plurality of categories

includes a plurality of images which are gradual variations of an identical<sup>4</sup> object on an attribute (**Sec. 3, including images of the same person at several different ages, i.e., age is the varied attribute**); and that said determining includes:

selecting an image which is most similar to said input image among images belonging to a category included in said plurality of categories and corresponding to an attribute of said input image as a similar image (**an image is selected which is most similar to the input image, Fig. 5; the age of the input image is estimated based upon its correspondence to the aging function of the most similar individual**).

The aforementioned combination of Lanitis with Lee teaches determining an image relating to a same object with said similar image as said selected image from images belonging to said specified category. This arises because Lanitis uses an aging function, i.e., a transformation which relates a younger image to an older image, such that the aging of an input image means that the aging function is followed through feature space from the closest matching image to an older image; the older image is therefore the selected image. This selection becomes more explicit when the technique of Lee is incorporated, because Lee more directly combines one image with another; that is, the older image would be the selected image which is directly applied to the input image.

17. With respect to **claim 5**, Lanitis and Lee teach the method of claim 1. Lanitis and Lee further teach that a database in which constituent components (**Lee, as in claim 3**

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<sup>4</sup> Examiner construes "identical" commensurate with the specification, i.e., not atom-for-atom identical, but

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**above**) are categorized is provided, and each of said plurality of categories includes constituent components of a plurality of images which are gradual variations of an identical object on an attribute (**Lanitis, as in claim 4 above**), and that said determining includes:

selecting a selected combination of said constituent components by which an image which is most similar to said input image is obtained (**Lee, as in claim 3 above**), by using said constituent components belonging to a category included in said plurality of categories and corresponding to an attribute of said input image (**Lanitis, as in claim 4 above**);

converting component coefficients corresponding to said selected combination into converted coefficients which are component coefficients corresponding to said specified category (**Lee, converting multiple coefficients in blending multiple components, e.g., equations on p. 60 or p. 63; see also Fig. 8**);

generating said selected image by using said converted coefficients and said constituent components belonging to said specified category (**Lee, e.g., output image in Fig. 8**).

18. With respect to **claim 6**, Lanitis and Lee teach the method of claim 1. Lanitis further discloses that each of said plurality of images is a face image of a person (**Sec. 3**) and said plurality of categories are categorized based on age (**Sec. 3**).

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rather, that each image represents the same object.

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19. With respect to **claims 7 and 8**, Lanitis and Lee teach the method of claim 6.

Lanitis further discloses selecting an older specified category when the age of the input image is lower than the desired age, and selecting a younger specified category when the age of the input image is higher than the desired age (**Sec. 7.1, especially Eq. 10, where the bracketed term indicates a younger result when the target age is higher than the input image age, and vice versa; as combined with Lee, this results in selecting an older or younger image as appropriate**).

20. With respect to **claims 9 and 10**, the limitations recited therein are substantially the same as those recited in claims 5 and 6, respectively (i.e., are strictly broader than claims 5 and 6), and are therefore rejected for the same reasons given above for claims 5 and 6.

21. **Claims 11-20** are rejected for the same reasons given above for the corresponding method in claims 1-10.

22. **Claims 21-25** are rejected for the same reasons given above for the corresponding method in claims 1-5.

23. **Claim 26** is rejected for the same reasons given above for the corresponding method in claim 9.

***Conclusion***

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Burson et al., U.S. Patent 4,276,570.

Brunelli et al., U.S. Patent 5,764,790.

Murata et al., U.S. Patent 5,867,171.

Murata, Y., U.S. Patent 5,966,137.

Dichter, W., U.S. Patent 6,137,903.

Attar et al., U.S. Patent 6,734,858 B2.

Zhang et al., U.S. Patent 6,828,972 B2.

Cheiky et al., U.S. Patent 6,919,892 B1.

Kim et al., U.S. Patent 7,203,346 B2.

Mummareddy et al., U.S. Patent 7,319,779 B1.

Rowe et al., U.S. Patent 7,362,886 B2.

Mariani, R., U.S. Patent Application Publication 2006/0233426 A1.

Wirtz, B., U.S. Patent 6,356,650 B1.

Wolberg, G., "Image morphing: a survey," The Visual Computer, Vol. 14 Nos. 8-9, pp. 360-372.

Rowland et al., "Manipulating facial appearance through shape and color," IEEE Computer Graphics and Applications, Vol. 15 No. 5, pp. 70-76.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barry Drennan whose telephone number is 571-270-7262. The examiner can normally be reached on Monday through Thursday, 9am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Werner can be reached on 571-272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Barry Drennan/  
Examiner, Art Unit 2624

/Brian P. Werner/  
Supervisory Patent Examiner, Art Unit 2624